



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## CPH5902

NPN Epitaxial Planar Silicon Transistor

N-Channel Silicon Junction FET

### High-Frequency Amplifier, AM Amplifier, Low-Frequency Amplifier Applications

#### Features

- Composite type with J-FET and NPN transistors contained in the CPH5 package, improving the mounting efficiency greatly.
- The CPH5902 contains a 2SK2394-equivalent chip and a 2SC4639-equivalent chip in one package.
- Drain and emitter are shared.

#### Specifications

**Absolute Maximum Ratings** at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
[FET]				
Drain-to-Source Voltage	V <sub>DSX</sub>		15	V
Gate-to-Drain Voltage	V <sub>GDS</sub>		-15	V
Gate Current	I <sub>G</sub>		10	mA
Drain Current	I <sub>D</sub>		50	mA
Allowable Power Dissipation	P <sub>D</sub>	Mounted on a ceramic board (600mm <sup>2</sup> X0.8mm)	350	mW
[TR]				
Collector-to-Base Voltage	V <sub>CB0</sub>		55	V
Collector-to-Emitter Voltage	V <sub>CEO</sub>		50	V
Emitter-to-Base Voltage	V <sub>EBO</sub>		6	V
Collector Current	I <sub>C</sub>		150	mA
Collector Current (Pulse)	I <sub>CP</sub>		300	mA
Base Current	I <sub>B</sub>		30	mA
Collector Dissipation	P <sub>C</sub>	Mounted on a ceramic board (600mm <sup>2</sup> X0.8mm)	350	mW
[Common Ratings]				
Total Dissipation	P <sub>T</sub>	Mounted on a ceramic board (600mm <sup>2</sup> X0.8mm)	500	mW
Junction Temperature	T <sub>J</sub>		150	°C
Storage Temperature	T <sub>stg</sub>		-55 to +150	°C

Marking : RB

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# CPH5902

## Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[FET]						
Gate-to-Drain Breakdown Voltage	$V_{(BR)GDS}$	$I_G=-10\mu A, V_{DS}=0V$	-15			V
Gate Cutoff Current	$I_{GSS}$	$V_{GS}=-10V, V_{DS}=0V$			-1.0	nA
Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=5V, I_D=100\mu A$	-0.4	-0.7	-1.5	V
Drain Current	$I_{DSS}$	$V_{DS}=5V, V_{GS}=0V$	10.0*		32.0*	mA
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=5V, V_{GS}=0V, f=1kHz$	24	38		mS
Input Capacitance	$C_{iss}$	$V_{DS}=5V, V_{GS}=0V, f=1MHz$		10.0		pF
Reverse Transfer Capacitance	$C_{rss}$	$V_{DS}=5V, V_{GS}=0V, f=1MHz$		2.9		pF
Noise Figure	NF	$V_{DS}=5V, R_g=1k\Omega, I_D=1mA, f=1kHz$		1.0		dB
[TR]						
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=35V, I_E=0A$			0.1	$\mu A$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=4V, I_C=0A$			0.1	$\mu A$
DC Current Gain	$h_{FE}$	$V_{CE}=6V, I_C=1mA$	135		400	
Gain-Bandwidth Product	$f_T$	$V_{CE}=6V, I_C=10mA$		200		MHz
Output Capacitance	$C_{ob}$	$V_{CB}=6V, f=1MHz$		1.7		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=50mA, I_B=5mA$		0.08	0.4	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=50mA, I_B=5mA$		0.8	1.0	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=10\mu A, I_E=0A$	55			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=1mA, R_{BE}=\infty$	50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=10\mu A, I_C=0A$	6			V
Turn-ON Time	$t_{on}$	See specified Test Circuit		0.15		$\mu s$
Storage Time	$t_{stg}$	See specified Test Circuit		0.75		$\mu s$
Fall Time	$t_f$	See specified Test Circuit		0.20		$\mu s$

\* : The CPH5902 is classified by  $I_{DSS}$  as follows : (unit : mA)

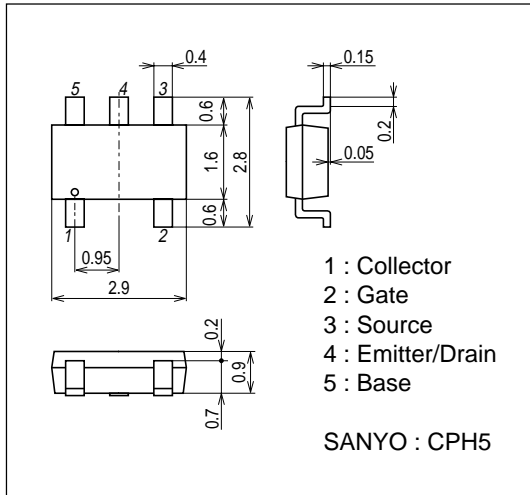
Rank	G	H
$I_{DSS}$	10.0 to 20.0	16.0 to 32.0

The specifications shown above are for each individual FET or transistor.

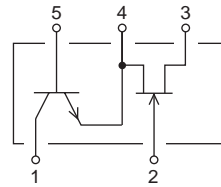
## Package Dimensions

unit : mmm

7017-007



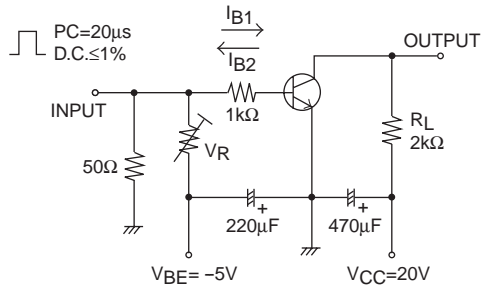
## Electrical Connection



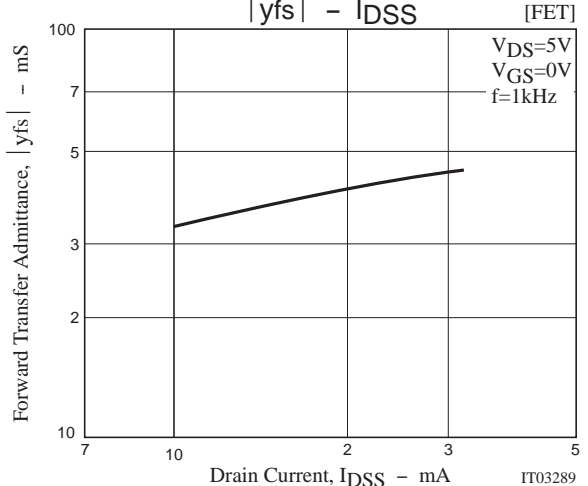
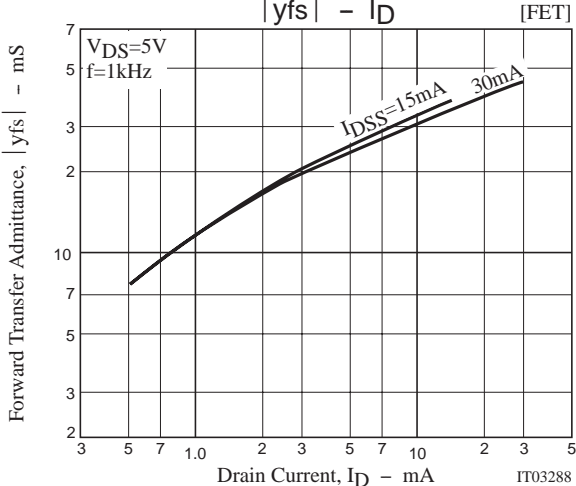
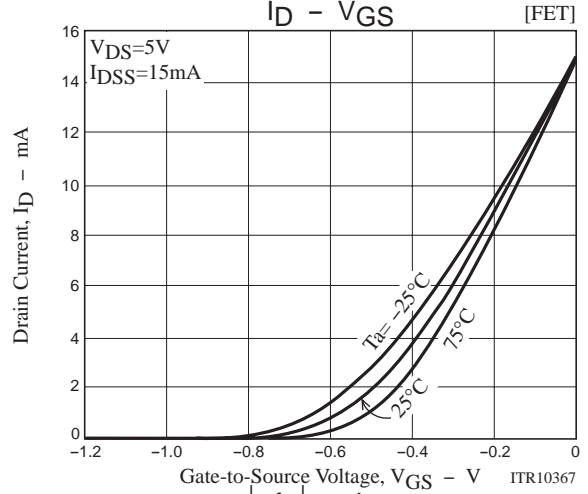
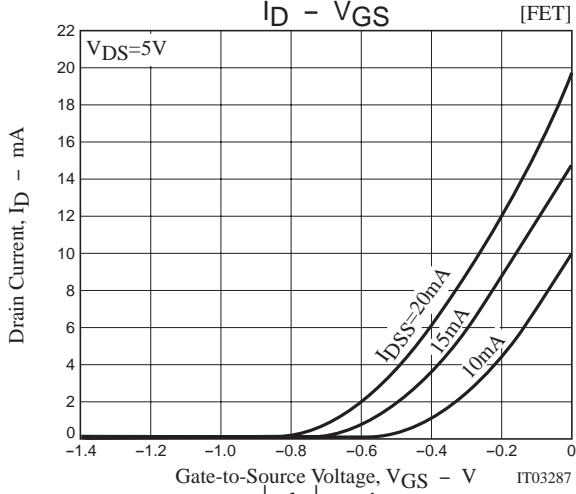
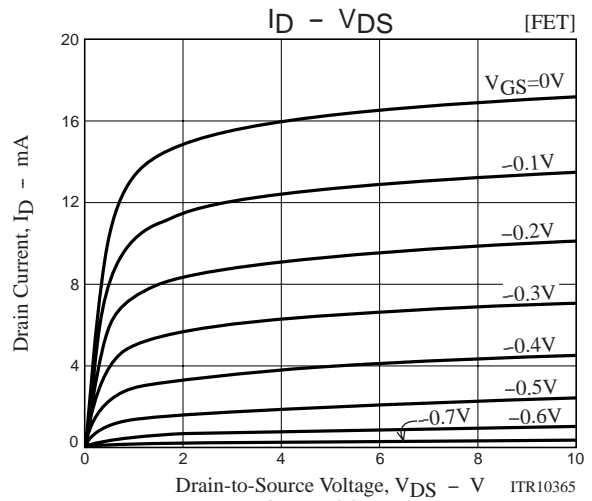
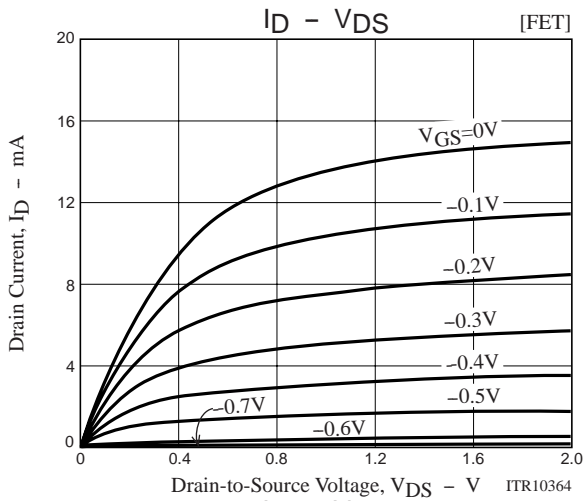
- 1 : Collector
- 2 : Gate
- 3 : Source
- 4 : Emitter / Drain
- 5 : Base

Top view

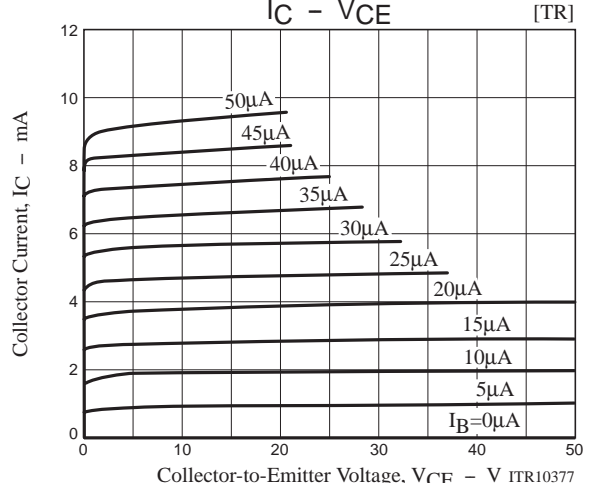
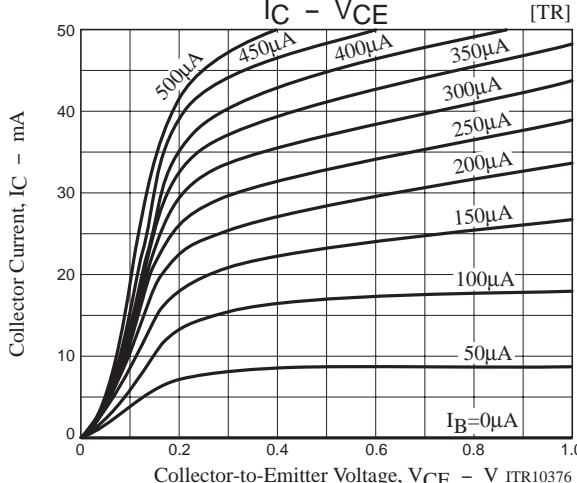
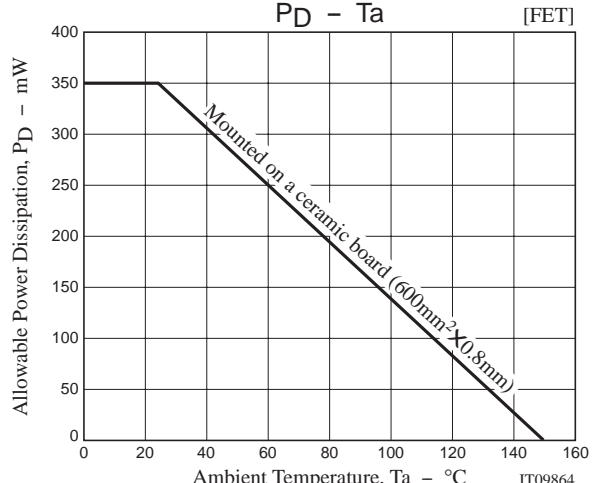
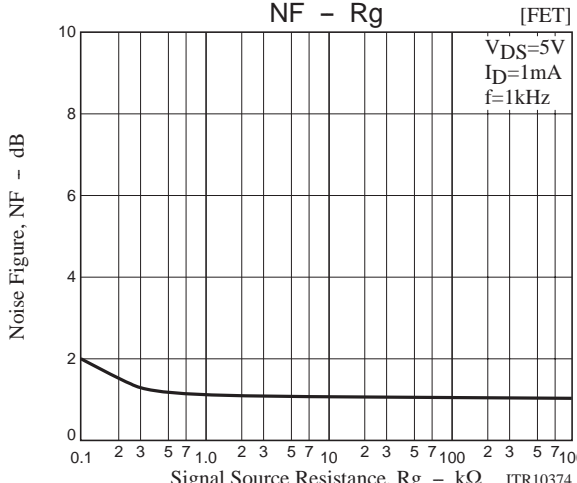
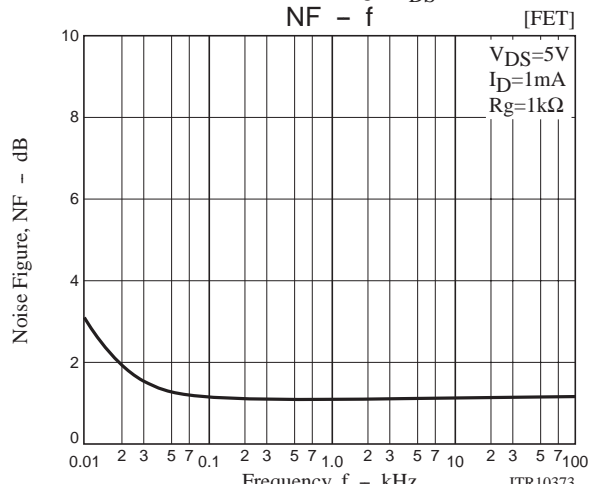
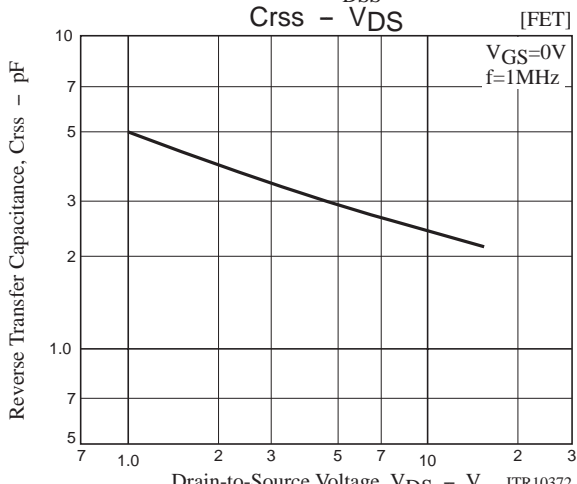
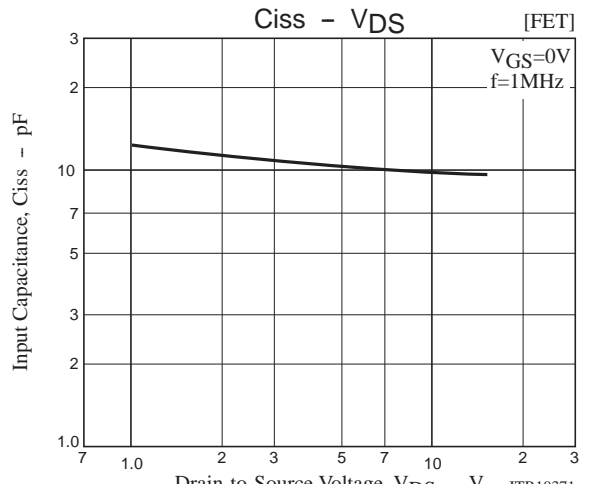
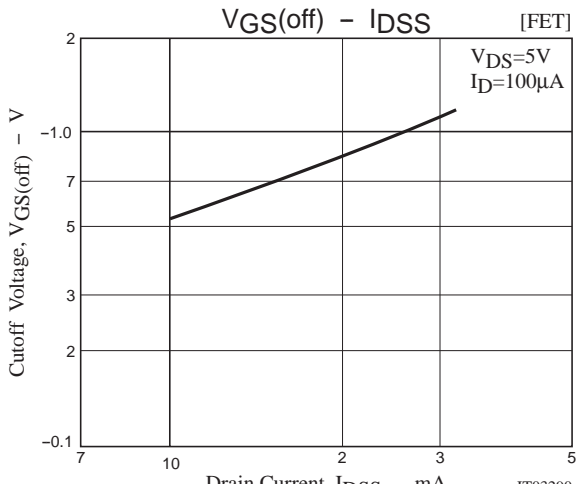
Switching Time Test Circuit



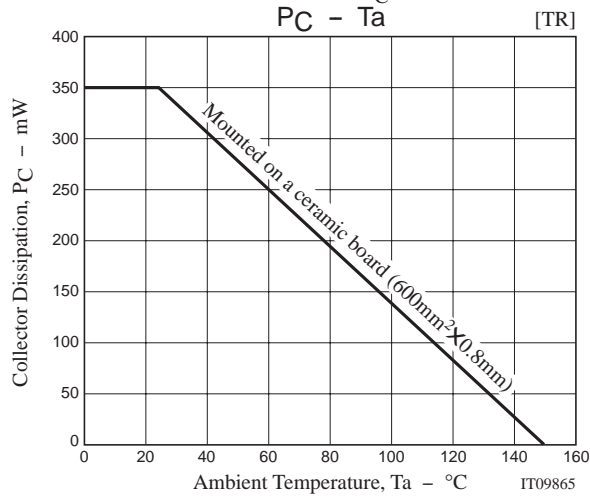
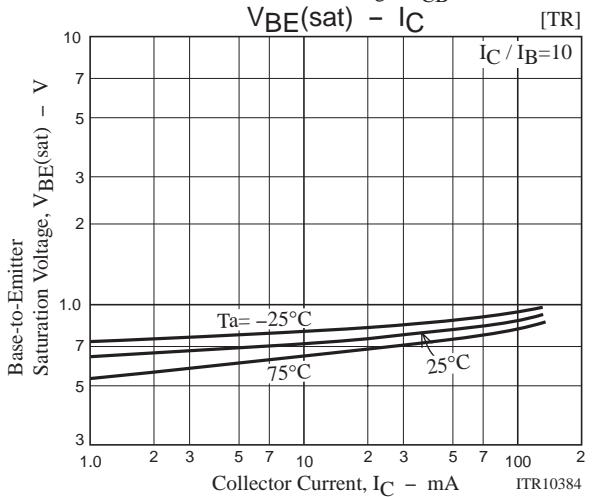
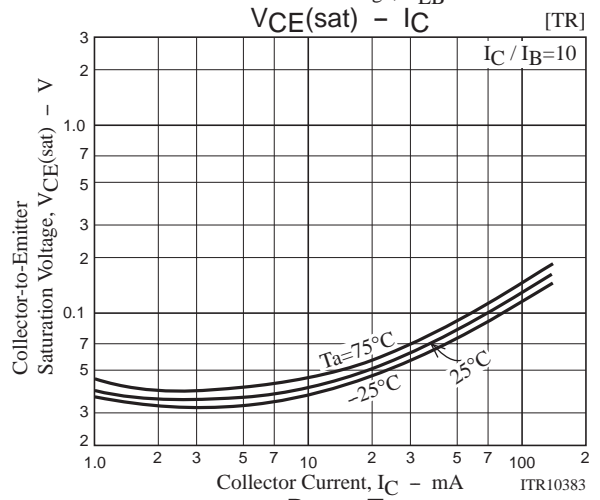
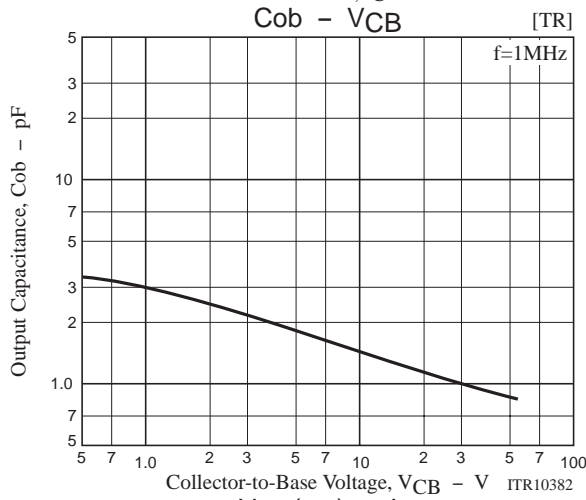
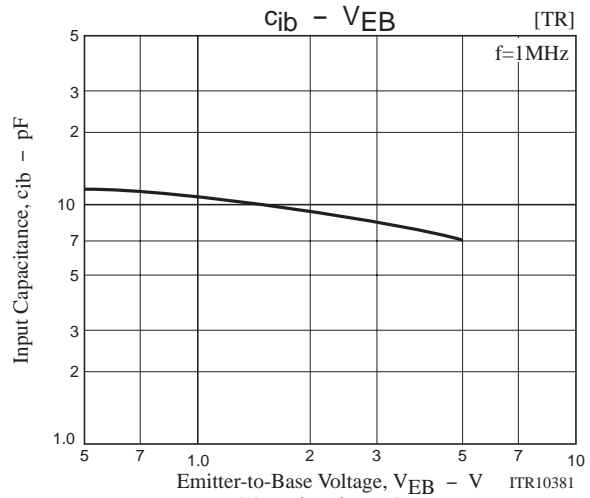
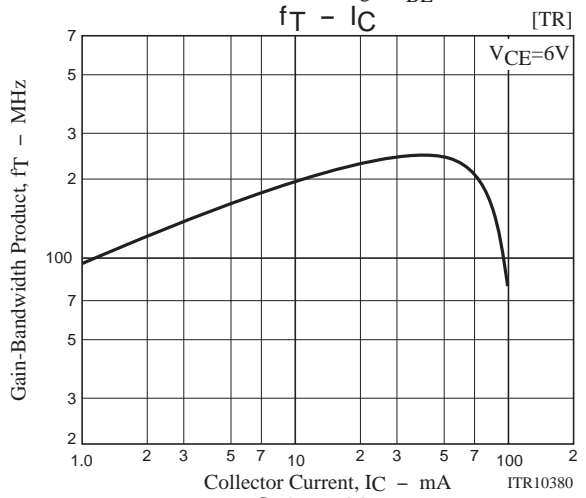
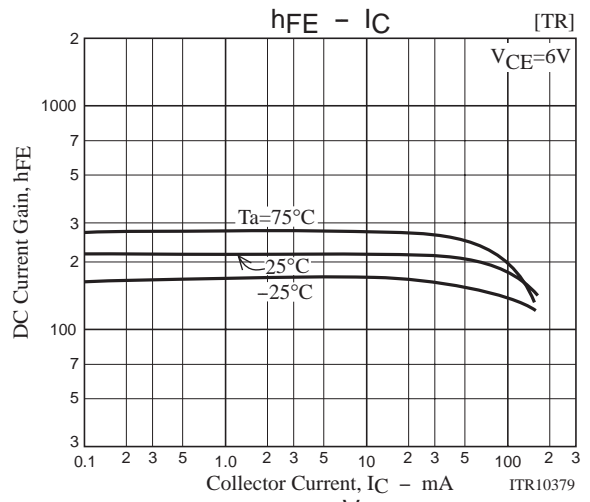
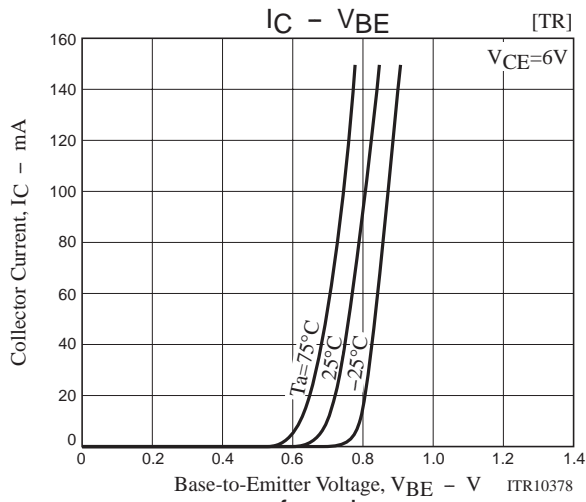
$10I_{B1} = -10I_{B2} = I_C = 10\text{mA}$



# CPH5902



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